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STATISTICAL BULLETIN
Metropolitan Life Insurance Co.

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THE ANNUAL TOLL OF ORPHANHOOD

Every year about a quarter of a million children under the age of seventeen lose their fathers by death, and about 170,000 more lose their mothers. These are the figures computed for the white population of the United States and for the year 1927, the last for which federal statistics were available when these calculations were made. The computations form an extension of the estimate reported in our April issue, of the total number of orphans under seventeen years of age in our population. It was noted that, with the mortality conditions of 1920, there must have been at that time in the United States about two million white children under seventeen years of age who had lost their fathers. About one and a half million had lost their mothers, and about 330,000 had lost both parents. Now this large body of orphaned children is, of course, the accumulation over past years of an annual contingent of newly bereaved families. It is of additional interest to ascertain the size of this annual contingent of new orphans. The number of orphans that arise newly each year depends on several factors, more particularly on the fertility of the population and on the mortality both of parents and of children. Using again the mortality and fertility data as they are known to us for the last census year (1920), an estimate has been made of this annual contingent of new orphans.

Stated in brief outline, the process by which the estimate is established is as follows: A computation is first made of the number of surviving offspring born within the last seventeen years to a cohort of 100,000 white females. Having thus ascertained the number of offspring per female for each age of life, these figures are applied to the observed deaths of women within the year, classified by age. Summing for women of all ages, we find the number of children who lost their mother during that year. A similar com-

putation is made to give the number of children who lost their fathers within the year.

The computations have been applied to the year 1927, the last for which the number of deaths classified by age was available. In dealing with the case of children under seventeen years of age, we may apply the fertility figures as of 1920, since these children were born between 1910 and 1927, so that the census year 1920 falls near the middle of this period.

It is in this way that the figures quoted in the first paragraph were obtained, showing that the number of children in this country under seventeen years of age who lose a parent (either father or mother) in the course of a year is over 400,000.

PERNICIOUS ANEMIA IN RECENT YEARS

Has the deathrate from pernicious anemia in the United States shown any response to methods of treatment based upon the pioneer work of Whipple, Robscheit-Robbins, Minot, Murphy and Cohn? This question may be answered tentatively by pertinent data from the experience of the Metropolitan Life Insurance Company's Industrial Department experience since 1921, shown below:

Deathrates per 100,000 from Pernicious Anemia. White Males and White Females, 25 to 74 Years of Age. Industrial Department, Metropolitan Life Insurance Company, 1921 to 1929

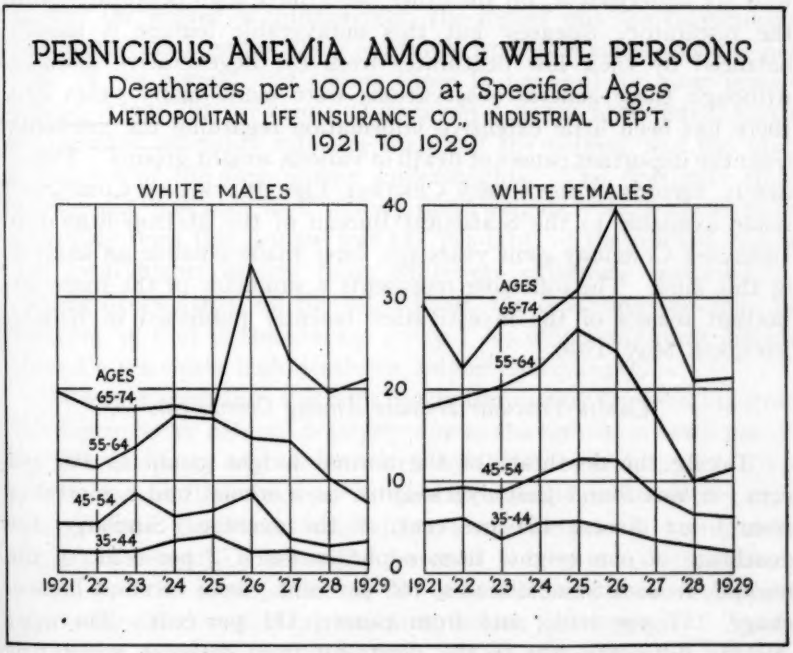
Color; Sex; Age	1921	1922	1923	1924	1925	1926	1927	1928	1929	Average 1921-1926	Per cent., Female of Male Deathrate
WHITE MALES:											
25 to 34	.3	.7	.4	.5	.7	.9	.8	1.2	.3	.7	.....
35 to 44	2.4	2.3	2.4	3.6	4.1	2.3	2.5	1.6	1.0	2.4	.....
45 to 54	5.3	5.3	8.7	6.1	6.8	8.7	3.8	3.0	3.5	5.6	.....
55 to 64	12.3	11.5	13.8	17.1	16.8	14.7	14.4	10.2	7.6	13.0	.....
65 to 74	19.7	17.8	17.8	18.2	17.4	33.6	23.3	19.7	21.1	21.2	.....
WHITE FEMALES:											
25 to 34	1.5	2.7	2.0	1.5	1.3	1.7	2.0	.9	.5	1.5	214
35 to 44	5.4	5.9	3.8	5.4	5.6	4.8	3.6	2.9	2.4	4.3	179
45 to 54	9.0	9.3	8.9	10.7	12.5	12.3	8.5	6.4	6.1	9.2	164
55 to 64	18.0	19.2	20.4	22.5	26.7	24.2	17.2	10.0	11.4	18.5	142
65 to 74	29.1	22.4	27.4	27.6	30.9	39.7	31.3	20.9	21.3	27.8	131

The work of G. H. Whipple, F. S. Robscheit-Robbins and their associates on blood regeneration led to the inquiries by Drs. George R. Minot and William P. Murphy into pernicious anemia as a dis-

order of blood formation. The publication in 1926 of results from an abundant liver diet in typical pernicious anemia cases was followed by the countrywide use of liver and liver extracts in the treatment of the disease. Reports of such treatment indicated in many cases a rapid remission of the anemia, marked symptomatic improvement, and the postponement of fatalities.

The data for policyholders of the Metropolitan Life Insurance Company, after 1926, show decisive decreases in the mortality rates of the disease in late middle life, especially for white females. If we confine the data to the age period 55 to 74 years, where the heaviest deathrates are recorded, we find a reduction of 43 per cent. in the mortality of white males, and of 50 per cent. for white females, between 1926 and 1929.

Whether the use of liver or liver extracts will result in a permanent lowering of the deathrate, or only to a postponement of death from the disease, remains to be seen from the data of individual case experience for subsequent years.



From the chart it seems that the *recorded* deathrate had been increasing from 1921 to 1926. This may have been due to increasing interest in the disease, to better diagnosis, and hence to increasing

certification of pernicious anemia as a cause of death. The reversal of this statistical tendency since 1927, in the face of wider clinical inquiries, and perhaps with greater precision of reporting, strengthens the conviction that the countrywide use of the liver and liver-extract treatment has resulted in a marked, temporary reduction in the death-rate since the treatment was instituted.

It may be noted that these figures show a much higher mortality rate among females than among males. The excess in the pernicious anemia deathrate among females seems to be greater in young adult life than in the older ages. This seems to run contrary to the prevailing conception that pernicious anemia is found more frequently in males than in females.

BODY WEIGHT AND CERTAIN CAUSES OF DEATH

High deathrates from the degenerative diseases among overweights cause a marked reduction in their life expectation. Persons who are underweight, on the other hand, have high deathrates from the respiratory diseases, but this unfavorable feature is usually balanced by their low deathrates from the degenerative diseases. Although these general observations were made many years ago, there has been little extensive information regarding the mortality from the important causes of death in various weight groups. Fortunately, records of the UNION CENTRAL LIFE INSURANCE COMPANY,* made available to the Statistical Bureau of the Metropolitan Life Insurance Company some years ago, have made possible an analysis of this kind. The following represents a summary of the more important results of the investigation recently published in HUMAN BIOLOGY, May, 1930.

Cardio-Vascular Disease Among Overweights

Taking the deathrate of the normal weight group as 100 per cent., it was found that overweights, as a whole, had a mortality from heart disease 151 per cent. of the average. Similarly, the deathrate of overweights from nephritis was 172 per cent. of the normal; from arterial diseases, 165 per cent.; from cerebral hemorrhage, 157 per cent.; and from cancer, 111 per cent. The most striking difference was in the mortality from diabetes, which was 257 per cent. of the average. At ages 45 and over, the above ratios

*Original records from Dr. William Muhlberg, Medical Director, and Messrs. E. E. Hardcastle, Actuary, and A. J. Koeppe, Assistant Actuary; tabulation by Statistical Bureau, Metropolitan Life Insurance Company.

were higher, and they increased with the degree of overweight. There were also appreciable excesses in the deathrates among overweights from angina pectoris, influenza, paralysis, appendicitis, cirrhosis of the liver and typhoid fever. The accident and suicide deathrates among overweights were also higher than the average, but these excesses do not have the same significance as the others. Underweights, on the other hand, show generally lower deathrates from the above causes. The mortality from heart disease was only 81 per cent. of the average; from nephritis, 77 per cent.; from arterial diseases, 74 per cent.; from cerebral hemorrhage, 70 per cent.; and from diabetes, only 64 per cent. The mortality from cancer among underweights, as a class, was approximately the same as among normals, although among those markedly underweight, it was lower.

Tuberculosis Among Underweights

Of the diseases which showed high deathrates among underweights, tuberculosis stood first by a wide margin. Moreover, the greater the degree of underweight, the higher was the tuberculosis deathrate. As a group, their mortality from this cause was 202 per cent. of the normal, but among those 15 per cent. or more underweight, it was 291 per cent. Overweights, on the other hand, had a tuberculosis mortality rate less than half the normal, and less than a quarter of the rate among underweights. The deathrate from pneumonia was also high among underweights. As a class, their mortality from this disease was 111 per cent. of the normal, but it was even higher among those who were extremely underweight. Among overweights, on the other hand, the deathrate was only 94 per cent. of that in the average group. No other important disease caused a relatively high deathrate among underweights.

It would seem that the high deathrates among overweights from the degenerative diseases is largely due to the burden of work put on the heart, kidneys and blood vessels by the extra body bulk. To a certain extent, the tendency toward overweight is hereditary and, consequently the excess mortality of overweights is not greatly subject to control. Overweight, however, is often due to the dietary habits and the mode of life of the individual and such overweight can be modified with great benefit to health and longevity. Taken altogether, underweight, biologically, seems to be an asset. It represents the most efficient type in respect to metabolism.

The present study, then, confirms the previous observation that persons who approach the mean of build or weight are best suited to

withstand the hazards of life. This mean is practically stationary once maturity is reached. Consequently, the so-called normal increase in weight with advancing age is not "normal" in respect to the outlook for health and longevity, and should be guarded against. The greatest problem today in the field of public health is to keep down the mortality in middle and later life, and it is not unlikely that public appreciation of these facts regarding body weight may help in its solution.

THE INHERITANCE OF LONGEVITY

Persons with long-lived parents have an average lifetime at least two to three years greater than those with a poor parental longevity. This observation is based on two investigations—one conducted recently by the Statistical Bureau of the Metropolitan Life Insurance Company and the other relating to the experience on nearly 300,000 men insured in thirty-four life insurance companies of the United States and Canada during the years 1869 to 1899, who were traced to their policy anniversary in 1900. The recent study was based on the insurance history of over 70,000 white men insured in the Metropolitan Life Insurance Company during the years 1899 to 1902 and traced to their policy anniversary in 1928.

In both studies the mortality of applicants with long-lived parents was distinctly lower than those with short-lived parents, at all attained ages under observation. On the average, the deathrate of those with favorable parental longevity records was nearly 20 per cent. less than in the other group, but at some ages, as much as 30 per cent. less. These differences were found consistently when the material was studied in greater detail according to the ages of the insured at the time they applied for insurance. Moreover, we know that persons with an inferior parental longevity were more carefully selected for insurance than those with long-lived parents, so that in all other respects they are better risks, on the average, than are those with a more satisfactory parental record. Were it not for this compensating factor, the differences in mortality would be greater than herein reported.

These differences in mortality between the groups resulted in differences in their expectations of life. At age twenty-five, those with long-lived parents had an expectation of life nearly two and one-half years greater than those with short-lived parents. These differences in favor of those with long-lived parents continued throughout life in both experiences, although they grew smaller with advanc-

ing age. Even at age sixty, the life expectancy of those whose parents had a superior longevity was over a year greater than that of the other groups. It should be remembered, too, that these differences are minimal because of the more rigorous selection by the insurance companies of those with short-lived parents.

The results of these studies confirm then the common belief that the duration of life depends, in part, on heredity. Earlier studies have yielded results in line with those of the present one, but criticism of the methods or the data used has cast some doubt on conclusions drawn from previous investigations. Moreover, for the first time the present study makes it possible to express the results in a form that is simple and easily understood. The differences in mortality and expectation of life in favor of persons with long-lived parents are clear-cut and show conclusively the effect of heredity on longevity. The gain in expectation of life from good heredity is, however, not as large as that obtained by the improvement in social and health conditions in recent years, and much less than that still attainable by such means. From the point of view of longevity, environmental influences are still more powerful than heredity, important as that may be.

HEALTH RECORD FOR MAY, 1930

In no preceding year have Winter and Spring health conditions been as favorable as in these seasons of 1930. At the end of May, the cumulative deathrate for approximately 19,000,000 Metropolitan Industrial policyholders was 12.3 per cent. below that for last year. Three of the five elapsed months—January, March and May—registered lower mortality rates than ever before recorded for these months. The May deathrate (8.7 per 1,000) may be compared with 9.0 for May, 1929.

The drop in the May deathrate, as compared with 1929, was in evidence all over the United States. Among policyholders living west of the Rocky Mountains, the deathrate was 6.1 per 1,000, as compared with 6.8 last year. In the rest of the United States, the May figure was 8.8 against 9.2 in 1929. Among approximately one and one-quarter millions of Canadian policyholders, on the other hand, this year's May mortality rate was slightly higher than in 1929. In both the United States and Canada, however, the cumulative deathrate for the five-month period, January to May, shows marked improvement over that for the corresponding period of last year.

Tuberculosis continues to be the most outstanding feature of the year's health record. The cumulative deathrate at the end of May

was at the remarkably low figure of 85.0 per 100,000, a reduction of 9.4 per cent. from that registered for the like period of 1929. On the basis of what has happened in past years, we are justified in expecting that the tuberculosis deathrate for the completed year will be at least 8 per cent. below that registered for the January to May period. In that event, we should record, this year, for the great body of our 19,000,000 insured wage-earners and their families, a tuberculosis deathrate of approximately 78 per 100,000. This would mark a reduction of 43.4 per cent. in ten years and of 65.3 per cent. since 1911, when the Company began to keep mortality records for individual causes of death. Expressed in another way, in every 100,000 of the insured industrial population, for every three lives that were lost through tuberculosis only nineteen years ago, only one life is sacrificed today. We must, nevertheless, face the fact that the conquest of tuberculosis is still far from complete. Despite these great gains, this disease still ranks third in importance to heart disease and pneumonia among the causes of death in the wage-earning population. Another year should witness its drop below cancer.

The deathrates for all four of the principal epidemic diseases of childhood have been low during the five elapsed months of 1930. In this group interest attaches chiefly to diphtheria, whose deathrate is now running 21.4 per cent. below last year's figure, and at a new minimum. The influenza deathrate is at about the normal figure prevailing in years not characterized by wide epidemic prevalence of this disease. The mortality from pneumonia has been unusually low for the Winter and Spring seasons. Three important conditions—heart disease, cancer and diabetes, which have had decidedly upward trends for years, show improvement in 1930, to date. The year bids fair to mark a decline in the deathrate from cardiac conditions. The decline in the cumulative deathrate for diabetes, up to the end of May, was 7.8 per cent. While this is an encouraging development (with respect to a disease whose deathrate has shown a continuous increase for five years) too much significance must not be attached to it. It should be borne in mind that the comparison is with that period of 1929 when a widespread influenza epidemic prevailed in both the United States and Canada. This outbreak hastened the deaths of many diabetics, and the diabetes mortality rate, during the first half of 1929, was higher than ever before experienced during the the winter and spring seasons. Developments of the next few months will determine whether or not the current year is destined to record a break in the steadily rising diabetes deathrate. The improvement for

cancer is very slight, and will be wiped out entirely if small increases are recorded during the rest of the year.

A considerable decline in the mortality from puerperal conditions is one of the most favorable developments of the 1930 mortality record, to date. In fact, there is good prospect that a new minimum will be established this year. The drop, as compared with the like period of 1929, amounted to 11.9 per cent.

There have been small increases this year for both suicides and homicides; and while the deathrate from accidents, as a group, has declined, that for automobile fatalities has again increased decidedly. There is every prospect that 1930 will be an exceptional year, if not a record year, from the standpoint of public health; but there is no indication that any progress will be made with respect to public safety.

The deathrate in the general population of the large cities of the United States in May was 12.7 per 1,000. This may be compared with 14.1 for April and with 12.9 for May, 1929. There was increased prevalence in May, as compared with April, of measles, poliomyelitis and typhoid fever, but there were fewer cases of diphtheria, influenza, scarlet fever and smallpox. Comparison with May, 1929, shows more sickness from measles, poliomyelitis and smallpox, with fewer cases of diphtheria, influenza, scarlet fever and typhoid fever.

Measles cases, in forty states, showed a rise from 67,353 in the first four weeks of April to 70,741 in the corresponding May weeks. The more noteworthy increases occurred in New York, Maine, Texas, Arizona and Washington. Cases of poliomyelitis, according to reports from forty-three states, increased from 59 in April to 102 in May. In the State of Washington alone, the increase was from 10 cases to 40. The number of diphtheria cases, in 32 states, dropped from 4,162 in April to 3,597 in May. In Ohio the decrease was from 202 cases to 91, and in Louisiana from 110 to 50. Scarlet fever cases, in 42 states, numbered 18,501 in April and 14,328 in May. The more noteworthy decreases occurred in North Dakota (from 135 to 64), in Kansas (from 534 to 264), and in Arkansas (from 40 to 18). Reported cases of smallpox dropped from 5,783 in April, to 4,424 in May, with the more pronounced declines in Ohio, Illinois and Kansas. Typhoid fever morbidity is beginning to show the usual seasonal rise toward its maximum incidence which always comes in the fall season. In May, 783 cases were reported from 43 states, as compared with 671 cases in April. The largest increases affected Missouri and South Carolina. The usual seasonal decline in influenza cases is in evidence.

Among the noteworthy public health activities during May, the following deserve special mention. Two Tennessee counties, Gibson and Sullivan have been selected by the COMMONWEALTH FUND, of New York, and the TENNESSEE STATE DEPARTMENT OF HEALTH as seats for special work in public health. THE UNITED STATES PUBLIC HEALTH SERVICE is cooperating with the ILLINOIS STATE BOARD OF HEALTH in a trachoma survey of four counties. A large percentage of blind pensioners in these counties lost their vision because of trachoma.

The following table shows the mortality among Industrial policyholders for May, 1930; April, 1930, and May, 1929, together with the cumulative deathrate for the first five months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-Paying Business in Industrial Department (Annual Basis)

MONTHS OF MAY, 1930; APRIL, 1930, AND OF MAY, 1929

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*				
	May, 1930	Apr., 1930	May, 1929	Cumulative, Jan.-May	
				1930	1929
TOTAL—ALL CAUSES	870.2	975.2	900.1	938.1	1069.5
Typhoid fever	1.2	1.0	1.5	1.1	1.5
Measles	6.0	6.5	5.0	4.4	4.3
Scarlet fever	2.6	4.1	3.5	3.6	3.6
Whooping cough	4.4	4.4	5.0	4.6	6.5
Diphtheria	5.7	6.2	8.1	7.7	9.8
Influenza	13.9	19.8	20.3	23.1	83.4
Tuberculosis (All forms)	84.5	90.4	91.6	85.0	93.8
Tuberculosis of resp'y system	73.5	77.4	81.0	73.9	83.6
Cancer	73.0	78.5	76.9	75.2	76.4
Diabetes mellitus	18.3	19.6	18.5	20.1	21.8
Cerebral hemorrhage	59.5	65.4	55.8†	62.8	62.3†
Organic diseases of heart	143.5	164.2	145.0	159.3	168.9
Pneumonia (All forms)	89.1	118.7	81.2	110.0	136.7
Other respiratory diseases	12.0	13.5	11.6	13.0	15.1
Diarrhea and enteritis	11.3	11.8	13.9	11.5	13.4
Bright's disease (Chronic nephritis)	67.5	76.4	70.3	71.2	76.5
Puerperal state	11.5	10.8	12.5	12.6	14.3
Suicides	10.1	10.3	8.9	9.4	8.7
Homicides	5.9	5.7	5.6	6.4	6.2
Other external causes (excluding suicides and homicides)	56.3	52.4	56.8	55.8	56.8
Traumatism by automobiles	19.0	17.9	16.9	17.7	15.9
All other causes	193.9	215.5	208.0	201.4	209.3

*All figures in this table include infants insured under one year of age and are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.

†Rate not comparable with that for 1930.

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DEATHRATES
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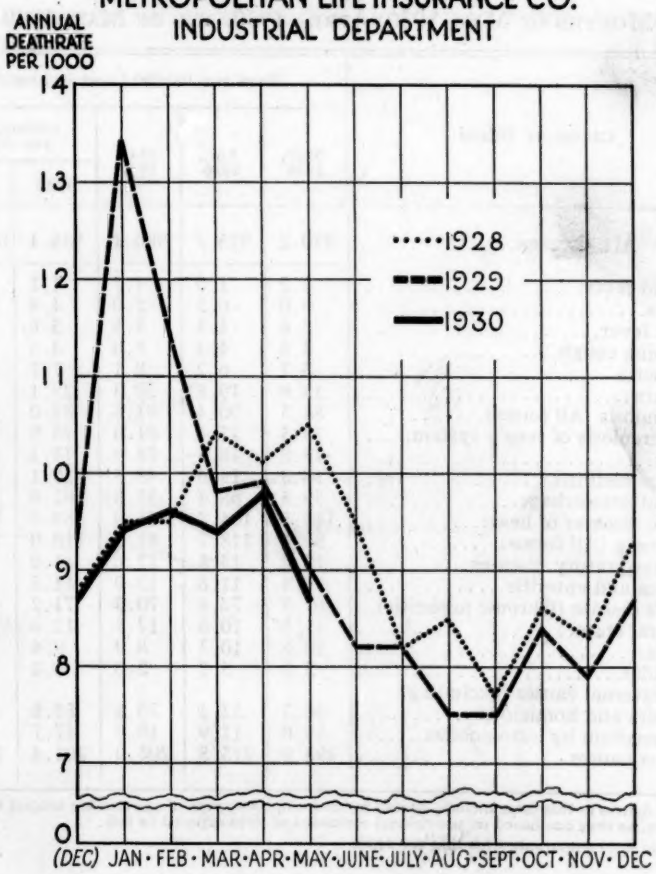
INDUSTRIAL DEPARTMENT



1928*	9.5	9.5	10.4	10.1	10.5	9.5	8.2	8.5	7.7	8.6	8.3	9.3
1929	13.4	11.4	9.8	9.9	9.0	8.2	8.2	7.5	7.5	8.4	7.9	8.7
1930	9.4	9.6	9.4	9.8	8.7							

* Rates for 1928 are final.

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